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ABSTRACT

A study was conducted to explore the relationship of race and sociceconomic status to the learning of reading skills among ninth-grade black and white students in the Tuscaloosa, Alabama, city and county schools. Each student was given diagnostic reading tests by timed, untimed, and auditory administration. Socioeconomic status was measured by students' "free lunch" status. The data show that untimed and auditory test administration improved test scores, especially among black students. Rather large, positive correlation coefficients for race indicate that higher test scores were associated with being white. The lower, negative correlation coefficients for sociceconomic status indicate that lower test scores were associated, though less strongly, with being in the free lunch program. Thus, the data show that disadvantaged students possessed lower reading readiness, and that these effects persisted through the ninth grade. The failure of later programs to remediate poor academic performance among the disadvantaged suggests the need for preschool health, nutritional, and educational interventions. (Author/GC)

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READING PERFORMANCES AS RELATED TO RACE AND SOCIO-ECONOMIC STATUS

BY

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Abstract

As part of a long-term research project, data from the Tuscaloosa (Ala.) city and county schools systems were separately analyzed to explore the relationship of race and socio-economic background (measured by "free lunch" status), to the learning of reading skills. The data clearly show that disadvantaged backgrounds result in lower reading readiness, and that these effects persist through the ninth grade. Black students are more likely than White students to benefit from untimed and auditory test administrations. The results of this study and other investigations emphasize the need for major pre-school interventions, preferably no later than age four.

The Committee on Diagnostic Reading Tests, Inc. is the publisher of The Diagnostic Reading Tests, which reliably and validly measure word attack, vocabulary and comprehension reading skills, kindergarten through college. As a by-product of a long-term research project, data became available for a separate analysis of race and socio-economic background (measured by "free lunch" status), and their relationship to learning the three reading skills measured by these tests. "Free lunch" is admittedly not a completely adequate measure of the latter factor. The data for the original study were obtained from testing all ninth grade students in Tuscaloosa, Alabama, county and city schools. In this analysis, we attempted to get a good cross-section of the data resulting from this testing by sampling every school and every class within each school. The complete study required that each student take the test (using comparable forms) by timed, untimed, and auditory administration. The students whose scores are used in this sample had completed all three test administrations.

Referring to Tables 1, 2 and 3, means, standard deviations and significances of differences of means (two-tailed t test) are presented for these basic data. Differences between the means of the Black and White groups,

(Insert Tables 1-3 about here.)

and of the high and low socio-economic groups are highly significant. Differences between the means of the various test administrations are also highly significant. (No conclusions can be drawn concerning the White-Free Lunch group with its small sample size, but the data are shown for completeness.) Tables 4, 5 and 6 present the effects of various methods of administration of the tests by showing the percentage change in scores according to type of administration. It should be noted that when a test is read to students

(Insert Tables 4-6 about here.)

as they also read it (auditory administration) an additional stimulus is used (hearing the material read) and research has shown that, except for good readers, the method of administration does improve the test scores. These data show that the White group is the least affected by the form of test administration. Moreover, test administration seems to affect the vocabulary score more than it does the comprehension score. The Black group benefits much more from untimed or auditory test administration. Again, the effect is more pronounced for the vocabulary score than it is for comprehension. Within the Black group, the benefits from untimed and auditory test administrations are about the same for both the free lunch and no free lunch subgroups.

Table 7 presents the effects of race and socio-economic background (as measured by free lunch status) on the development of vocabulary and comprehension reading skills when administered by three methods: silent, timed; silent, untimed; and auditory. These data are remarkably consistent among the various test scores. The rather large, positive correlation

(Insert Table 7 about here)

coefficients for race indicate that higher test scores are associated with being White. The somewhat lower, negative correlation coefficients for socio-economic status indicate that the lower test scores are associated with being in the free lunch program. As far as reading performances are concerned, it is bad to be poor; worse to be Black; still worse to be Black and poor.

Discussion

What other conclusions may be drawn regarding the relationship of race and socio-economic status to learning reading skills, the end results

of teaching reading, and how teaching might be more effective, given the data presented here?

1. If it is obvious that reading tests are not culture-free measures, would culture-free reading tests (if such could be produced) be valid for the purpose of measuring the development of efficient reading skills? No!
2. Then how do these data add to the available knowledge concerning the teaching of reading? From the outset, race and socio-economic status of a student should be a red light noticed by the earliest contact with an individual in our formal educational program, and, hopefully, in pre-formal programs. It is known that such factors as readiness for reading, nutrition, the language spoken in the home, the educational background of the parents and their attitude toward education, as well as the security and emotional empathy exhibited in day to day living in the home, are closely related to reading learning. Our schools can go only so far in correcting for the lack of these favorable conditions. Also, it is known that it becomes harder, with the passage of time, to reverse the factors which negate success in learning to read. "Free lunch" for a child undernourished until formal school entrance, will probably help him to be more successful in the classroom, but it usually will not wholly offset the effect of poor nutrition on later learning. The same is true of the language the child has heard as he grew from the day of

his birth to the date of school entrance. During this time, he heard, and thus learned to express himself, in the language pattern of the home and community.

McKay, et al. (1978) have investigated the effect of major interventions in the lives of preschool children, interventions that included health, nutrition and educational components. The programs provided some 1,000 hours of treatment, about two-thirds of which was educational. The experimental design provided for treatment being initiated at four different ages, with measures of general cognitive development at five different points in time.

The data of their study fit (r = .97) an equation of the type $y = a\, e^{-bx}$, where x is the age at which treatment is begun and y is the precent of gap closure compared with a control group. Although one must be careful about drawing conclusions from so few data points, it is interesting that at y = 100, x = 44 months. If this is even approximately true, it explains why so many remedial programs fail or result in minimal improvements. They begin far too late, with the result that reading scores drop farther and farther below those of more advantaged children.

Teaching of these children must compensate in every way possible for the negative factors in their backgrounds. Hopefully, these are the children who will be present in pre-school programs at as early an age as possible. Here they will meet and profit from cross-cultural contacts with children from all socio-economic backgrounds. This should result from culturally well rounded groups in pre-school contacts. Pre-planning can produce such groups.

Consistent formal and informal testing and anecdotal records will show the extent to which individual children are developing readiness, and

later, learning formal reading skills, "Competency" testing at the upper grade levels comes too late to help children handicapped by race and poor socio-economic and culturally deprived backgrounds. Every effort should be made very early to supply the background factors and special emphasis on learning formal reading skills. It is far more effective to do this when the results will positively affect learning, rather than at a later date when these students are found to be "incompetent" readers and are then penalized by receiving a non-academic diploma. With the former, the good of the learner is put first, while the latter protects the reputation of the school. These non-academic diplomas may readily be interpreted as an indication that the individual has not recovered from the effect of factors known at the start to be a deterrent to language learning.

All of this has been known before these statistics were presented. It is hoped that the presentation of these data may spur appropriate action where positive steps have not yet been taken to alleviate the factors known to be deterrents to language learning and, more specifically, learning to read.

Reference

McKay, Harrison, Sinisterra, Leonardo, McKay, Arlene, Gomez, Hernando and Lloreda, Pascuala, Improving cognitive ability in chronically deprived children, Science, 1978, 200, 270-278.

Table 1

Means, Standard Deviations and Significance of Differences in Means for Score 2, Vocabulary, The Diagnostic Reading Tests: Upper Level Survey Section, for Three Methods of Administration[a,b,c]

	Methods of Administration							
	Silent, Timed			Silent, Untimed			Auditory	
	Mean	S.D.		Mean	S.D.		Mean	S.D.
Total Sample (N=500)	21.74	10.61	**	29.22	11.77	**	32.55	11.25
Black (N=270)	16.55	7.79	**	23.79	9.37	**	27.64	9.59
White (N=230)	27.83	10.24	**	35.60	11.09	**	38.32	10.29
Free Lunch (N=136)	15.82	6.87	**	22.55	8.28	**	26.42	8.15
No Free Lunch (N=364)	23.95	10.91	**	31.71	11.92	**	34.84	11.40
White, FL (N=3)	21.33	3.06		24.33	2.52		28.67	4.16
White, NFL (N=227)	27.92	10.28	**	35.74	11.09	**	38.44	10.29
Black, FL (N=133)	15.70	6.89	**	22.51	8.36	**	26.37	8.22
Black, NFL (N=137)	17.37	8.52	**	25.03	10.13	**	28.88	10.64

[a] Differences between means on either side of the double asterisks are significant at $p < .01$. Single asterisks indicate $p < .05$.

[b] Standard errors for group differences calculated on the assumption that the means are uncorrelated. Standard errors for test administration differences calculated as:

$$s_{\bar{X}_1-\bar{X}_2} = \sqrt{s_{\bar{X}_1}^2 + s_{\bar{X}_2}^2 - 2r_{12}s_{\bar{X}_1}s_{\bar{X}_2}}$$

because the means are correlated.

[c] Critical values of t, two-tailed tests, are as follows:

N	$t_{.05}$	$t_{.01}$
500	1.960	2.576
364	1.961	2.578
270	1.962	2.582
230	1.965	2.591
227	1.965	2.591
137	1.978	2.613
136	1.978	2.613
133	1.979	2.616

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Table 2

Means, Standard Deviations and Significance of Differences in Means for Score 3, Comprehension, The Diagnostic Reading Tests: Upper Level Survey Section, for Three Methods of Administration[a]

	Methods of Administration							
	Silent, Timed			Silent, Untimed			Auditory	
	Mean	S.D.		Mean	S.D.		Mean	S.D.
Total Sample (N=500)	17.02	7.70	**	18.70	7.34	**	21.08	7.26
Black (N=270)	13.35	5.69	**	15.45	5.65	**	17.60	5.77
White (N=230)	21.33	7.51	**	22.50	7.27	**	25.15	6.68
Free Lunch (N=136)	12.85	4.81	**	14.88	5.09	**	17.31	5.75
No Free Lunch (N=364)	18.58	7.99	**	20.12	7.54	**	22.48	7.26
White, FL (N=3)	14.67	3.21		15.33	4.04		19.00	6.56
White, NFL (N=227)	21.42	7.52	**	22.60	7.26	**	25.23	6.66
Black, FL (N=133)	12.80	4.84	**	14.87	5.12	**	17.27	5.75
Black, NFL (N=137)	13.88	6.38	**	16.01	6.08	**	17.93	5.79

[a] Differences between means on either side of the double asterisks are significant at $p < .01$. See also footnotes b and c, Table 1, which apply here as well.

Table 3

Means, Standard Deviations and Significance of Differences in Means for Score 4, Total, The Diagnostic Reading Tests: Upper Level Survey Section, for Three Methods of Administration[a]

	Methods of Administration							
	Silent, Timed			Silent, Untimed			Auditory	
	Mean	S.D.		Mean	S.D.		Mean	S.D.
Total Sample (N=500)	38.76	17.16	**	47.87	18.03	**	53.65	17.33
Black (N=270)	29.90	12.16	**	39.23	13.68	**	45.28	13.92
	**			**			**	
White (N=230)	49.16	16.32	**	58.01	17.23	**	63.47	15.73
Free Lunch (N=136)	28.67	10.46	**	37.43	12.07	**	43.73	12.49
	**			**			**	
No Free Lunch (N=364)	42.53	17.65	**	51.77	18.34	**	57.35	17.44
White, FL (N=3)	36.00	1.73		39.67	5.69		47.67	10.50
White, NFL (N=227)	49.33	16.36	**	58.26	17.20	**	63.68	15.69
Black, FL (N=133)	28.50	10.52	**	37.38	12.19	**	43.64	12.55
				*				
Black, NFL (N=137)	31.25	13.46	**	41.02	14.82	**	46.88	15.00

[a] Differences between means on either side of the double asterisks are significant at $p < .01$. Single asterisks indicate $p < .05$. See also footnotes b and c, Table 1, which apply here as well.

Table 4

A Comparison of Changes in Score 2, Vocabulary, The Diagnostic Reading Tests: Upper Level Survey Section, When Administered by Three Different Methods

	Percentage Change in Scores[a]		
	Untimed vs. Timed	Auditory vs. Timed	Auditory vs. Untimed
Total Sample	34.4	49.7	11.4
Black	43.8	67.0	16.2
White	27.9	37.7	7.6
Free Lunch	42.5	67.0	17.2
No Free Lunch	32.3	45.5	9.9
Black, FL	43.4	68.0	17.2
Black, NFL	44.1	66.3	15.4

[a] Sample Calculation for Total Sample, Untimed vs. Timed:

$$\text{Percentage change} = \frac{\text{Untimed mean} - \text{Timed mean}}{\text{Timed mean}} \times 100 = \frac{29.22 - 21.74}{21.74} \times 100 = 34.4$$

Table 5

A Comparison of Changes in Score 3, Comprehension, The Diagnostic Reading Tests: Upper Level Survey Section, When Administered by Three Different Methods

	Percentage Change in Scores[a]		
	Untimed vs. Timed	Auditory vs. Timed	Auditory vs. Untimed
Total Sample	9.9	23.9	12.7
Black	15.7	31.8	13.9
White	5.5	17.9	11.8
Free Lunch	15.8	34.7	16.3
No Free Lunch	8.3	21.0	11.7
Black, FL	16.2	34.9	16.1
Black, NFL	15.4	29.2	12.0

[a] See footnote to Table 4 for sample calculation.

Table 6

A Comparison of Changes in Score 4, Total, The Diagnostic Reading Tests: Upper Level Survey Section, When Administered by Three Different Methods

	Percentage Change in Scores[a]		
	Untimed vs. Timed	Auditory vs. Timed	Auditory vs. Untimed
Total Sample	23.5	38.4	12.1
Black	31.2	51.4	15.4
White	18.0	29.1	9.4
Free Lunch	30.6	52.5	16.8
No Free Lunch	21.7	34.9	10.8
Black, FL	31.2	53.1	15.5
Black, NFL	31.3	50.0	14.3

[a] See footnote to Table 4 for sample calculation.

Table 7

The Effects of Race and Free Lunch Status on Reading Skills as Measured by The Diagnostic Reading Tests: Upper Level Survey Section, When Administered by Three Different Methods

(Total Sample, N=500)

Method of Administration	Race	Free Lunch
Silent, Timed		
Score 2, Vocabulary	.53	-.34
Score 3, Comprehension	.52	-.33
Score 4, Total	.56	-.36
Silent, Untimed		
Score 2, Vocabulary	.50	-.35
Score 3, Comprehension	.48	-.32
Score 4, Total	.52	-.35
Auditory		
Score 2, Vocabulary	.47	-.33
Score 3, Comprehension	.52	-.32
Score 4, Total	.52	-.35

Note: These are point-biserial correlation coefficients, and all are significant beyond p=.001.